

## MA134 College Algebra Common Final Topic Review

*Disclaimer: The Topic Review is not a complete list of topics covered in College Algebra, but should be used as a tool when studying for the final exam.*

For the final exam, you should be able to:

1. Solve equations/find zeros of functions
  - a. Quadratic
    - By factoring (page 201 example 1)
    - By completing the square (page 204 example 3)
    - By quadratic formula (page 206-207 example 5)
  - b. Polynomial with degree greater than 2
    - Use the rational zeros theorem to find zeros of a polynomial function/solve a polynomial equation and write as a product of linear factors (page 294-295 example 6)
  - c. Solve exponential and logarithmic equations (See #5d and #5e below)
2. Solve inequalities
  - a. Polynomial of degree greater than or equal to 2 (page 322-323 example 3)
  - b. Rational (page 324-325 example 4)
3. Graph functions. Accurately plot and label x-intercepts and any horizontal or vertical asymptotes. Label axes appropriately.
  - a. Quadratic
    - Find the vertex by the method of completing the square (page 218-219 example 1)
    - Find the vertex using the formula (page 221 example 4)
  - b. Use transformations
    - Know basic functions listed on the bottom of page 151 to the top of page 152
    - Be able to apply transformations listed on page 161
    - See examples 4 through 6 on page 153-159
  - c. Polynomial functions of degree greater than 2 (page 274-276 example 3)
  - d. Rational functions (page 311 example 9)
    - Refer to the two summary boxes on page 310. The final **will not** include a rational function with an oblique asymptote.
  - e. Piece-wise functions (page 125-126 example 6)
  - f. Exponential and logarithmic functions (See #5d and #5e below)
4. Work with and understand function notation
  - a. Add, subtract, multiply and divide functions (page 136-137 example 2)
  - b. Composition of functions (page 140 example 5)
  - c. Find domain and range (page 82-83 example 10)
  - d. Find the inverse of a function (summary box on page 353, page 354-355 example 8)
  - e. Evaluate a difference quotient (page 138 example 4)
  - f. Use graphs to find relative minima and maxima (page 122 example 2)
  - g. Use graphs to find intervals over which a function is increasing or decreasing (page 120-121 example 1)

5. Work with and understand exponential and logarithmic functions
  - a. Graph exponential functions
    - Understand properties of exponential functions (page 364)
    - Graph an exponential function using transformations (page 364-365 example 3)
    - Find domain, range and equation of the asymptote of an exponential function
  - b. Graph logarithmic functions
    - Understand properties of logarithmic functions (page 377)
    - Graph an exponential function using transformations (page 383 example 11a, b)
    - Find domain, range and equation of the asymptote of a logarithmic function
  - c. Understand and be able to use properties of logarithmic functions (summary box on page 396, page 390-395 examples 1 through 10)
  - d. Solve exponential equations (page 399-403 examples 1 through 4)
  - e. Solve logarithmic equations (page 404 -407 examples 6 through 9)
6. Work with and understand sequences and series
  - a. Understand notation for the  $n$ th term of a sequence (page 577 example 1)
  - b. Use a recursive formula for a sequence to write several terms (page 581 example 6)
  - c. Use sigma (summation) notation (page 580 example 4)
  - d. Arithmetic sequences and series
    - Find the  $n$ th term (page 586-587 examples 2 through 4)
    - Find the sum of the first  $n$  terms (page 589-590 examples 5 through 7)
  - e. Geometric sequences and series
    - Find the  $n$ th term (page 597 example 3)
    - Find the sum of the first  $n$  terms (page 597-598 examples 4 and 5)
    - Find the sum of an infinite geometric series, if it exists (page 600 example 6)
7. Given an equation, identify and graph conics
  - a. Parabolas
    - Graph a parabola (gray box on page 527, page 527-528 example 1)
  - b. Circles
    - Know and be able to use the standard equation of a circle (gray box on page 67, page 67 examples 10 and 11, page 534 example 1)
  - c. Ellipses
    - Graph an ellipse centered about the origin (gray box on page 537, page 537-539 examples 2 and 3)
  - d. Hyperbola
    - Graph a hyperbola centered about the origin (gray box on page 546, page 547-548 example 2)
8. Solve applied problems involving
  - a. Linear equations and functions (page 112 example 9)
  - b. Maxima or minima (page 222-223 example 6)
  - c. Exponential growth and decay (page 417-418 example 5)